REMARKS

Claims 1-7 are pending. Claims 8-17 are being added.

Claim 1 has been amended. Claim 1 has been amended to clarify the nature of interruption of turbo decoding.

No new matter is being added.

On page 2 of the Office Action, the Office Action objects to the title ("A decoder") as not being descriptive of the invention. The Office Action has requested that a new title be provided that is clearly indicative of the invention. Applicants feel that the invention relates to decoders and so the title currently on file is adequate. However, in order to facilitate the request made, the Applicant has amended the title to "A MULTIMODE DECODER".

On page 2 of the Office Action, the Office Action also objects to the specification under 37 CFR 1.77(b) for failing to contain section headings as required by 37 CFR 1.77(b). Applicants are traversing this objection.

Amended pages 1, 3, and 4 contain section headings in conformance with 37 CFR 1.77(b).

On pages 3 and 4 of the Office Action, claim 1 is rejected under 35 USC § 112, first paragraph, on the grounds that claim 1 appears to recite a single means (a decoding element) contrary to MPEP 2164.081(a). Applicants respectfully submit that the claims as they read are not means plus function claims under 35 USC § 112 paragraph 6. However, claim 1 and other dependent claims are being amended to change decoding element to decoder. Applicants further submit that the use of the term element in these claims does not invoke section 35 USC § 112 paragraph 6 in that there is sufficient structure recited.

Claims 6 and 7 are being amended to depend from claim 5 to remove antecedent basis issues as well.

On page 4 of the Office Action, claims 1 and 4 are currently rejected under 35 USC § 102(b) as being anticipated by US 6,166,667 (hereinafter referred to as "Park"). Applicants are traversing this rejection.

The application presently contains one independent claim, namely claim 1. Below, Applicants explain that Park does not teach all of the elements of claim 1.

Cited Park relates to a channel encoding/decoding device (col. 1, lines 17-18). According to col. 2, lines 30-32, encoded channel information is convolutionally decoded

or turbo decoded in response to an information message representing service type and data frame size.

Col. 3, line3 – col. 7, line 26 covers the subject of encoding. Col. 7, lines 30-41, explains (with reference to FIG. 4) that an adaptive channel decoding device includes an information message receiver 80 for receiving an information message from a message transceiver 10. A CPU 82 for analyzing the service type and transmission rate of input data based on the information message, determines which decoder to use, reading corresponding decoding mode commands from control command storage 84 and outputting control signals. The switching control signals enable selection of convolutional decoding or turbo decoding in a selective convolutional/turbo decoder 100. The selective convolutional/turbo decoder 100 is formed as an "adaptive dual decoder". In this respect, the decoder 100 comprises a first soft-decision Viterbi decoder 102 coupled to an interleaver 112, the interleaver being coupled to a second soft-decision Viterbi decoder 114. The second soft-decision Viterbi decoder 114 is coupled to a de-interleaver 116, the de-interleaver being coupled to the first soft-decision Viterbi decoder 102 to provide feedback (col. 8, lines 41-65). The only criteria used by the decoding device of Park are service type (voice or data) and transmission rate. Hence, switching only takes place in response to these criteria.

Referring to claim 1, claim 1 recites an apparatus including a decoder comprising:

- a decoder arranged to operate in a first mode for decoding a turbo encoded data stream and in a second mode for decoding a viterbi encoded data stream, wherein:
- the decoder is responsive to a first control signal from a controller for switching from the first mode to the second mode during decoding of a turbo code block so as to interrupt decoding of the turbo code block and
- responsive to a second control signal for switching from the second mode to the first mode to allow continued decoding of the turbo code block, thereby resuming decoding of the turbo code block.

However, and with particular reference to the underlined feature of claim 1 above, cited Park fails to teach a decoder that is responsive to a first control signal for switching from a first mode to a second mode during decoding of a turbo code block so as to interrupt decoding of the turbo code block and that the decoder is responsive to a second control signal from the decoder for switching from the second mode to the first mode to allow

continued decoding of the turbo code block, thereby resuming decoding of the turbo code block, as recited in claim 1.

In view of the reasoning provided above, Applicant submits that Park does not anticipate claim 1.

On page 5 of the Office Action, claims 1and 2 are currently rejected under 35 USC § 102(e) as being anticipated US 7,149,951 (hereinafter referred to as "Seo").

As mentioned above, the application presently contains one independent claim, namely claim 1. Below, Applicants explain that Seo does not teach all of the elements of claim 1.

Seo relates to a mobile terminal (FIG. 2) having a receiver 100 for receiving data from an antenna. A memory 200 is provided for storing received data and a CPU 400 is provided for controlling data stored in memory to be input into a predetermined decoder (col. 4, lines 55-59). A switch 300 is controlled to connect to a decoder based upon a control signal issued by the CPU 400. The decoders include a Viterbi decoder 500 and a turbo decoder 600. Notably, the mobile terminal includes a common memory unit 800, which the Viterbi decoder 500 and the turbo decoder 600 are able to access for storing data in common (col. 4, lines 60-67). According to col. 4, line 3, a conversion unit 700 is provided for setting a memory assignment of the Viterbi decoder 500 and the turbo decoder 600 and then mapping them to the common memory 800. The CPU 400 checks a so-called decoding order and transmits a corresponding decoding selection signal to the switch 300 (col. 5, lines 27-29). However, the mobile terminal of Seo employs separate decoders as opposed to a dual-purpose common decoder and the selection of the decoder is governed by the decoding order, and Seo is very unclear about the nature of the decoding order. Indeed, the 3GPP specification TS 34.108 referred to in Seo is silent in connection with the decoding order.

Referring to claim 1, claim 1 recites an apparatus including a decoder comprising:

- a decoder arranged to operate in a first mode for decoding a turbo encoded data stream and in a second mode for decoding a viterbi encoded data stream, wherein:
- the decoder is responsive to a first control signal from a controller for switching from the first mode to the second mode during decoding of a turbo code block so as to interrupt decoding of the turbo code block and

- responsive to a second control signal for switching from the second mode to the first mode to allow continued decoding of the turbo code block thereby resuming decoding of the turbo code block.

However, and with particular reference to the underlined feature of claim 1 above, cited Seo fails to teach a decoder that is arranged to operate in a first mode for decoding a turbo encoded data stream and in a second mode for decoding a viterbi encoded data stream and is responsive to a first control signal for switching from a first mode to a second mode during decoding of a turbo code block so as to interrupt decoding of the turbo code block and that the decoder is responsive to a second control signal for switching from the second mode to the first mode to allow continued decoding of the turbo code block, thereby resuming decoding of the turbo code block, as recited in claim 1.

In view of the reasoning provided above, Applicant submits that Seo does not anticipate claim 1.

Claim 2 depends from claim 1. By virtue of this dependence, claim 2 is also new.

On page 6 of the Office Action, claims 1-7 are currently rejected under 35 USC § 102(b) as being anticipated by the article "A unified turbo/Viterbi channel decoder for 3GPP mobile wireless in 0.18-μm CMOS" (IEEE Journal of Solid-State Circuits, Vol. 37, no. 11, November 2002) (hereinafter referred to as "Bickerstaff et al.").

The application presently contains one independent claim, namely claim 1. Below, Applicants explain that Bickerstaff et al. does not teach all of the elements of claim 1.

Cited Bickerstaff et al. relates to a channel decoder chip architecture that is 3GPP compliant. A unified decoder is disclosed (page 1555, right-hand column, line 38) that exploits the commonality between a Viterbi algorithm and a maximum a posteriori (MAP) algorithm. Sections II A, B and C on page 1556 of Bickerstaff et al. discuss the Viterbi algorithm, the LogMAP algorithm and the process of turbo decoding. Turning to section III (Architecture) on page 1556 (right-hand column) of Bickstaff et al., reference is made to Fig. 4 where it is explained (lines 1-3 of Section III) that the decoder architecture comprises interface logic, memories, control logic, and trellis processors that are shared for turbo and Viterbi decoding. The architecture also comprises a first de-interleaver and post-decoder BER estimation circuit (lines 305 of Section III). Lines 15-18 of Section III explain that an input buffer, an extrinsic/path history memory, and path-metric memory are provided.

Sub-section A on page 1557 of Bickerstaff et al. simply describes the architecture of Fig. 4 being used in a Viterbi mode (see FIG. 5) to perform convolutional decoding. Similarly, sub-section B on pages 1557-1558 of Bickerstaff et al. describes the architecture of Fig. 4 being used in a "turbo" mode (see fig. 7) to perform turbo decoding. Bickerstaff el al. fails to disclose any information concerning switching between Viterbi and turbo modes of the architecture of Fig. 4. Indeed, it is particularly noted that page 6, line 18 of the Office Action makes a blanket reference to page 1557 of Bickerstaff et al. and fails to point accurately to particular lines on this page of cited Bickerstaff et al. as disclosing details of switching between modes of the unified decoder of Bickerstaff et al.

Referring to claim 1, claim 1 recites an apparatus including a decoder comprising:

- a decoder arranged to operate in a first mode for decoding a turbo encoded data stream and in a second mode for decoding a viterbi encoded data stream, wherein:
- the decoder is responsive to a first control signal from a controller for switching from the first mode to the second mode during decoding of a turbo code block so as to interrupt decoding of the turbo code block and
- responsive to a second control signal for switching from the second mode to the first mode to allow continued decoding of the turbo code block thereby resuming decoding of the turbo code block.

However, and with particular reference to the underlined feature of claim 1 above, cited Bickerstaff et al. fails to teach a decoder that is responsive to a first control signal for switching from a first mode to a second mode during decoding of a turbo code block so as to interrupt decoding of the turbo code block and that the decoder is responsive to a second control signal for switching from the second mode to the first mode to allow continued decoding of the turbo code block, thereby resuming decoding of the turbo code block, as recited in claim 1.

In view of the reasoning provided above, Applicant submits that Bickerstaff et al. does not anticipate claim 1.

The dependent claims depend from claim 1 and are allowable for at least this reason.

The case is believed to be in condition for allowance and notice to such effect is respectfully requested. If there is any issue that may be resolved, the Examiner is respectfully requested to telephone the undersigned.

Respectfully submitted,

SEND CORRESPONDENCE TO:

By: /David G. Dolezal/

David G. Dolezal
Attorney of Record
Reg. No.: 41,711
Telephone: (512) 996-6839
Fax No.: (512) 996-6854

Freescale Semiconductor, Inc.
Law Department

Customer Number: 23125